

A study on gifted students' teachers: The relationship between SAC teachers' attitudes towards AI and their responsible AI use level

Sibel Erbaş ¹, Osman Kayhan ², Recep Çakır ¹, Özgen Korkmaz ³

¹ Department of Computer Education and Instructional Technologies, Amasya University, Amasya, Türkiye

² Vocational School of Technical Sciences, Amasya University, Amasya, Türkiye

³ Department of Computer Engineering, Bandırma Onyedi Eylül University, Balıkesir, Türkiye

ABSTRACT

This study was conducted to reveal the relationship between the attitudes of teachers working in Science and Art Centres (SACs) towards artificial intelligence and their level of responsible use of AI. The study group consists of teachers working in SACs educating gifted students in Türkiye in 2024–2025 term. 310 teachers from different subject areas participated in the study. Descriptive and correlational survey design, which are quantitative research methods, were used in the study. The General Attitudes towards Artificial Intelligence Scale (GAAIS) and Responsible AI Use Scale were used as data collection tools. MANOVA, Pearson Correlation and Linear Regression analysis were conducted to determine the findings. According to the findings although there was no statistically significant difference according to gender, age, education level differences, and level of experience, it was determined that there was a significant difference in daily internet use. Besides it was found that in the positive attitude towards AI, the mean of male is higher than that of female. Other findings include that the cybersecurity factor of responsible AI use is medium correlated with negative attitudes, and additionally, responsible AI use and its sub-factors predict 20% of the total variance of negative attitudes towards AI. For the conscious and responsible use of artificial intelligence, differentiated training programmes and interactive learning environments can be created for teachers; therefore, positive attitudes towards the use of artificial intelligence can be increased and teachers' awareness in this field can be increased

ARTICLE HISTORY

Received 12 December 2025

Accepted 13 February 2026

KEYWORDS

Artificial intelligence
Attitudes towards AI
Technology in education
Science and Art Center teachers

CORRESPONDENCE

Osman Kayhan



Introduction

Artificial Intelligence (AI) is a technology that people encounter in most areas of their lives, yet often do not know that they are interacting with an AI system. Baker et al. (2019) define AI as the integration of human cognitive abilities into artificial systems through the advances in science and technology. AI has infiltrated daily life, but the lack of knowledge about how AI works or what it is quite common in all ages and professions (Ding et al., 2024). In contrast to this lack of knowledge, it can be argued that AI will create new opportunities for people by increasing productivity and knowledge output, leading to increased efficiency, facilitating the solution of complex problems, taking over the fulfilment of repetitive tasks, giving more time to explore, experiment and learn, and ultimately improving people's creativity and quality of life (Hartwig, 2023). In addition, this innovative technology, which continues to arouse curiosity in people wherever it is mentioned (Ünal & Kılınç, 2020), has started to arouse curiosity in many different areas of education and training.

The elements that draw attention in the definitions of the word “teaching” are that it takes place in a certain period of time, it includes in-class activities, the process requires preliminary preparation, the process should be carried out in accordance with a specific plan and program, measurement and evaluation can be made at the end, and it should be concluded with a document or grade (Kaş & Köktürk, 2021). Nowadays, it is inevitable that these elements are affected by AI. Mollick and Mollick (2023), in their study on the effective use of AI in different processes of teaching, emphasized that AI is very important to support learning if it is used consciously. İşler and Kılıç (2021), on the other hand, compiled the possible contributions of AI to the education process and emphasized that the role of the teacher will change in an AI-supported process and even the teacher should be in a centralized role.

Due to the needs of our age, it is necessary to train teachers who can use today's technology efficiently and follow technological developments in order to increase success in education and training processes and to raise individuals who can keep up with the development. In the National AI Strategy 2024–2025 Action Plan published in Türkiye, 12 of the 71 goals are goals for which the Ministry of National Education is responsible for action, in other words goals that serve the purpose of using AI in education (T.C. Presidency Digital Transformation Office, 2024). Therefore, as a priority for schools, training teachers who can adapt to AI and other new technologies and teacher education should be developed in an innovative way (Erden & Uslupehlivan, 2020; Liua et al., 2021). The training and professional development that teachers will receive in this field is also very important to increase their awareness and practical skills in AI systems (Alshorman, 2024; İşler & Kılıç, 2021). Teachers who want to be involved in such trainings should first accept AI. However, people's general attitudes towards AI have a great role in their acceptance of AI (Schepman & Rodway, 2020). The integration of AI into education can only be associated with the attitude of teachers towards these tools. In addition, teachers' having sufficient knowledge about AI will directly affect their willingness to use AI in classroom settings (Edwards et al., 2018). Therefore, incentives for teachers to develop positive attitudes and perceptions towards the use of AI will significantly affect the inclusion of AI in education (Celik & Ark 2022). Teachers' perspectives, attitudes and beliefs are among the important factors affecting teaching processes such as planning, implementation and evaluation (Bulut et al., 2023).

In the literature, there are studies on different study groups with many different variables such as readiness, perception, attitude, awareness towards AI. In a study conducted by Wang et al. (2021), it was revealed that AI attitudes have a positive effect on teachers' willingness to use AI technologies. Pörn et al. (2024), in a study on K–12 mathematics teachers' expectations and attitudes towards AI, found that participating teachers had knowledge about digital tools and their interest and attitudes towards AI were positive, and concluded that they would accept the use of AI in the classroom more easily and earlier in the future. Yıldırım and Akcan (2024) proposed AI–Professional Development Model (PDM) in a study conducted for chemistry teachers and emphasized in one of the results of the same study that attitude towards AI and ethics are important factors for teachers to include AI both in their classroom practices and in their own professional development. Yue et al. (2024) conducted a study on K–12 teachers and found that teachers with experience in teaching AI had a positive difference in their attitudes towards AI education compared to those without experience. Çayak (2024), in his research on teachers working in public schools in Turkey, found that there was a significant difference between teachers' attitudes towards AI and their AI literacy. Consequently, studies show us that many characteristics of teachers such as their experiences, attitudes and awareness affect their willingness to include AI in their classroom practices and to use it actively in processes such as lesson preparation and assessment.

Bringing a different perspective to technology, AI has also brought along debates on ethical and responsible use. Many questions remain unanswered, such as how AI will work in the classroom, the role of teachers in this process, how to protect the privacy of student information despite too much data, the long-term effects of using AI in education, how to achieve success, and its ethical and social implications (Holmes et al., 2019). It is also important how teachers, who will be one of the primary users of AI, perceive AI technology now that radical changes are being felt in educational environments (Korkmaz & Cilsalar–Sağnak, 2024). Nguyen et al., (2023) investigated whether there is an international consensus on the ethical use of AI in education with the Artificial Intelligence in Education (AIED) study. Akgun and Greenhow (2022) drew attention to the ethical challenges of AI in education.

International organizations such as UNESCO, United Nations System (2022), OECD (2019), European Parliament have taken initiatives on the ethical use of AI and developed policies that will be valid internationally. Despite their close relationship, the terms “responsible AI use,” “AI ethics,” and “AI awareness” refer to different aspects of how teachers interaction with AI. AI ethics generally refers to normative principles and values such as fairness, accountability, transparency, and privacy that guide the development and evaluation of AI systems (Jobin et al., 2019; UNESCO, 2022). AI awareness, on the other hand, focuses on teachers' cognitive comprehension and knowledge of AI systems' workings, opportunities, and and their potential risks (Ng et al., 2021). Responsible AI use differs from these concepts

by emphasizing real-world behavioral practices. It addresses how people apply moral awareness and principles in authentic educational settings, covering topics like data protection, appropriate use, and critical assessment of AI-generated outputs (Akgun & Greenhow, 2022; Dignum, 2019). Therefore, while AI ethics provides the normative framework and AI awareness reflects the level of understanding, responsible AI use represents the practical implementation of these principles in teachers' professional practices.

Limitations AI ethics has been included as a part of many studies, but research on teachers' responsible AI use has been quite limited. Teachers are particularly concerned about data security and privacy, and ethical issues play a big part in the conversation, and generally have a high level of ethical awareness when it comes to using AI technology (Bezjak, 2024). Karataş & Yüce (2024) examined the views of pre-service teachers on AI applications and found that pre-service teachers expressed concerns about issues such as reliability and confidentiality of data, privacy and ethics. In a study examining teachers' perspectives on AI in education, it was discovered that, despite serious ethical and privacy problems, AI in education was viewed generally positive (Uygun, 2024). Although there are ethical issues to be considered when interacting with this innovative technology, educational institutions should not ban this technology, but rather realize that it has the potential to support education (García-Peñalvo, 2023). Therefore, educators should be familiar enough with AI to guide students in responsible and ethical use (Hasanein & Sobaih, 2023). In particular, teachers who feel the need to provide enriched content while guiding gifted students in Science and Art Centers (SAC) (Kaynar, 2024) may need it.

SACs, where the study group of the research is working, are special education centers that help gifted students at primary and secondary school level to reveal their individual talents and to use these talents in the most efficient way during the period they continue their education and training processes in official educational institutions (Baykoç Dönmez, 2004). As recommended by the World Health Organisation and adopted by many experts and researchers in this field, children with an IQ of 130 or higher are considered as 'gifted' (Uzun, 2004). SAC is of great importance for gifted children, who are thought to make up 2% of the population, to use their capacities at the highest level and to reveal their potential (Aslan et al., 2023). Since developments in the fields of science and arts move societies forward and since it has become clear that the gifted are a national treasure who will contribute significantly to this task, the education of the gifted has become an important issue all over the world (Genç, 2016). Gifted students have the ability to perceive quickly and easily, learn quickly and easily, solve problems and reason (Çetin, 2023). Moreover, it is recognised by researchers that the quality and efficacy of gifted education could be greatly enhanced by technology (Chen et al., 2013) to ensure the rapid adaptation of students and to meet their learning needs.

Like the students, the teachers working in SAC are selected according to evaluation criteria that are determined by their performance levels. Therefore, with the responsibility of working with gifted students and the necessity of taking an active role in projects, SAC teachers are highly motivated to develop themselves further and to follow both innovative approaches and technological innovations to be used in their classrooms. Teachers who contribute to the education of the gifted play a very important role, and teachers who demonstrate academic excellence, flexible thinking, tolerance and impartiality in the educational process are the most influential factors in the process (Gökdere et al., 2003). Teachers of gifted children with different needs and characteristics need to have certain qualities in terms of personality, professional and pedagogical behaviours in order to understand the needs and differences of gifted children and to be effective in the educational process, and they also need to adopt a positive approach to gifted education (Dağlıoğlu, 2010). The fact that SAC teachers are involved in the education and training process of gifted students does not require teachers to be gifted like students, but they are expected to have expert-level competence in the fields they teach (Miedijensky, 2018; Sak, 2012). For that reason, each teacher feels the need to renew themselves on current issues in their field and they need to participate in local, national and international projects individually or by mentoring gifted students. Teachers also should be conscious and competent in providing children a suitable learning environment, equipping them with the information and abilities to use this environment effectively, and exposing them to a variety of perspectives in their learning processes (Dağlıoğlu, 2010). In this process, they feel the need to bring many digital technologies into their classrooms and use them effectively in their lessons. It is thought that it is quite fast for these teachers working in SAC to get acquainted with AI and to use it actively with their students in educational environments. Hence, it is believed that the opinions of gifted teachers about AI will contribute significantly to the literature. In particular, a study investigating the level of relationship between teachers' attitudes towards AI and their responsible AI use has not been found in the literature. With this study, the level of relationship between teachers' AI attitudes and their responsible AI use will be determined and comments can be made about integrating AI into teachers' lessons. Not only the fact that a similar study is not included in the literature, but also the fact that it was conducted for SAC teachers, increases its originality value. It is also thought that it will contribute to the studies to be conducted for teachers about attitude and ethical awareness. In line with these needs, the attitudes of teachers from different branches towards the use of AI

and their ethical awareness have been our focus. From this point of view, the problem status and sub-problems of the research are as follows;

Research Problem:

What are Science and Art Center teachers' responsible AI use level and their attitudes towards AI?

Sub-problems:

To what extent are SAC teachers' positive and negative attitudes towards AI and their level of responsible use of AI?

Do attitudes towards AI and responsible AI use differ according to the gender, educational level and the daily internet use of SAC teachers?

Is there a relationship between SAC teachers' attitudes towards AI and their responsible AI use?

Do responsible AI use of SAC teachers predict their positive and negative attitudes towards AI?

Method

Research design

Descriptive research method, one of the quantitative research methods, was used in the study. Descriptive research method is a research method conducted on a large community, in which the opinions of individuals in this community about events and phenomena are taken and the event or phenomenon being investigated is tried to be described through these ideas and opinions (Karakaya, 2012). In the continuation of the research, the relational survey method was used. The relational survey model is defined as a survey method that aims to determine whether there is a change between more than one variable together. In this model, it is tried to determine whether the variables change together and how this change occurs (Karasar, 2011).

Study group

The study group of this research was determined using purposive sampling method. Purposive sampling is used in many researches because increasing the reliability of the findings in research is based on the unbiased determination of a quality sample. (Nyimbili & Nyimbili, 2024) The study group of the research consists of teachers working with gifted students in SACs in Turkey in the 2024–2025 term. A total of 324 teachers from many different branches working in different provinces of Turkey participated in the study. 10 teachers were excluded from the study group due to incomplete completion of the questionnaire. The data of 4 teachers were excluded from the analysis as they were identified as outliers that significantly distorted the normal distribution of the dataset. Analyses were conducted on the data of 310 teachers. The distribution of the study group according to gender, age, teaching experiences and level of education is summarized in Table 1.

Table 1. Demographic characteristics of the teachers

	Variable	Frequency (%)
Gender	Female	196 (%63,2)
	Male	114 (%36,8)
Age groups	22–30	13 (%4,2)
	31–40	139 (%44,8)
	41–50	130 (%41,9)
	Above 51	28 (%9,0)
Teaching Experience	1–5	15 (%4,8)
	5–10	47 (%15,2)
	11–20	145 (%46,8)
	Above 21	103 (%33,2)
Level of Education	Graduate	119 (%38,4)
	Postgraduate	191 (%61,6)
Average daily internet use	0–2	67 (%21,6)
	2–4	147 (%47,4)
	Above 4	96 (%31,0)

When the demographic characteristics of the teachers are analysed, it can be stated that 63.2% of the participants are women. We see that teachers aged between 31–50 years and teachers with 11–20 years of teaching experience are in the majority. The reason for this can be interpreted as that teachers need to meet certain criteria in order to be accepted to SACs (Satmaz, 2023) and in order to meet these criteria, they need documents and documents that they will acquire during their teaching experience. The majority of the participants are those who use the Internet between 2–4 hours a day on average.

Data collection

The General Attitudes towards Artificial Intelligence Scale (GAAIS)

The Turkish Version of the General Attitudes to Artificial Intelligence Scale (Kaya et al., 2022), adapted from Schepman & Rodway (2022)'s The General Attitudes towards Artificial Intelligence Scale (GAAIS), was used as a data collection tool. With this scale, the effect of demographic characteristics of the participants on their p_attitudes and n_attitudes towards AI was measured. The scale consists of a total of 20 items, 12 of which are positive and 8 of which are negative. The items are scored according to a 5-point Likert scale (1=strongly disagree, 5=strongly agree). The internal consistency reliability of the scale was reported as Cronbach's Alpha 0.82 for positive items and 0.84 for negative items (Kaya et al., 2022).

Responsible AI Use

For this scale developed by the researchers, national and international resources were reviewed and 16 teachers were interviewed using a semi-structured interview form. An item pool was created using the collected data. After the items were examined in detail, 36 items were selected and the opinions of 2 language experts were first obtained and then 3 field experts were consulted. As a result of the opinions, the items were reduced to 27. Using these items, data were collected from 535 teachers in total. Factor analysis was performed based on these data. After the 3-stage analysis, the number of items was reduced to 15 and the items were grouped into 3 factors. Data were collected from 304 study groups for EFA and 231 study groups for CFA, and the data collected from 43 people after 1 week for test-retest were evaluated.

Within the scope of this research, Erbaş et al. (on press)'s Responsible AI Use Scale was used as the second scale. With this scale, the effect of demographic characteristics of the participants on their responsible AI use was measured. The scale consists of 3 sub-factors and 15 items in total. The sub-factors are cyber security, legal responsibility and transparency and each factor consists of 5 items. Items are scored according to a 5-point Likert scale (1=strongly disagree, 5=strongly agree). The internal consistency reliability of the scale was reported as Cronbach's Alpha 0.88 for F1 Cyber Security, 0.86 for F2 Legal Responsibility and 0.88 for F3 Transparency (Erbaş et al., on press). Fit Indices Values of the scale are as follows: RMSEA value is 0,076 and CMIN/DF value is 2,322, NFI=0.954, IFI=0.973, CFI=0.973, RMR=0.040 and SRMR=0.0351. All these values indicate that this scale has a good fit (Tabachnick & Fidell, 2007).

Data analysis

The collected data were analysed by using IBM SPSS Statistics 20. Within the scope of this study, a normality test was conducted before determining the tests to be used to analyse the data obtained from the teachers. Table 2 shows the skewness and kurtosis values of both scales and their sub-dimensions obtained from the normality test.

Table 2. Skewness and kurtosis values of scales with sub-dimensions

Scales	Sub-Dimensions	n	Skewness	Kurtosis
General Attitudes towards AI	P_Attitudes AI	310	-,609	,734
	N_Attitudes AI	310	,257	-,397
Responsible AI Use	Cyber Security	310	-,635	,315
	Legal Liability	310	-,412	-,093
	Transparency	310	-,476	-,350
	Total	310	-,264	,508

In the normality distribution test, if the skewness and kurtosis values of the data are between +1.5 and -1.5, the assumption that the data are normally distributed is expressed (Tabachnick & Fidell, 2013). Table 2 shows that the skewness and kurtosis values of the General Attitudes towards AI scale and the Responsible AI Use scale and its sub-dimensions are within the appropriate range. Therefore, our data meet the assumption of normal distribution and parametric tests were used in the analysis.

Based on the assumption of normal distribution of the data, multivariate analysis of variance (MANOVA) was performed to determine the differentiation between variables such as gender differences, educational level differences, daily internet use. The relationship between the variables were analysed by correlation analysis and multiple regression analysis was performed to see whether the sub-dimensions of responsible AI use predicted the p_attitude and n_attitude towards AI.

Findings

Descriptive findings

The descriptive statistics of “Turkish Version of the General Attitudes to Artificial Intelligence Scale” are given in Table 3.

Table 3. Mean and standard deviation values of scales

	Sub-Dimensions	n	$\bar{X}$	sd
General Attitudes towards AI	P_ Attitudes AI	310	3,95	,67
	N_ Attitudes AI	310	2,85	,84
Responsible AI Use	Cyber Security	310	4,00	,70
	Legal Liability	310	4,20	,56
	Transparency	310	3,95	,69
	Total	310	4,05	,47

When teachers' general attitudes to AI were analysed, p_attitudes of teachers were higher than n_attitudes ($\bar{X}=3,95$, $sd=,67$). The second scale which was used in this research was “Responsible AI Use Scale” and the descriptive statistics of this scale are also given in Table 3.

According to the results shown in Table 3 the average value of the scores of responsible AI use was found as 4,05. When it is analysed according to the sub-dimensions Legal Liability has the highest average of all ($\bar{X}=4,20$, $sd=,56$) and Transparency has the lowest level ($\bar{X}=3,95$, $sd=,69$).

Gender differences

In order to analyse whether SAC teachers' attitudes towards AI and responsible AI use levels differ according to their gender, MANOVA analysis was applied. When the sub-factors of Responsible AI Use were included in the analysis, the assumption of variance homogeneity was not met as a result of Box's M test ($\text{Box } M < .02$). When the average of the whole scale was included, it was determined that the Levene test result ($p > .05$) met the assumption and the Box M test ($\text{Box } M = .171$, $p > .05$) met the necessary conditions.

Table 4. MANOVA analysis results according to gender

Variables	Gender	N	$\bar{X}$	S	df	t	p
Responsible AI Use	Female	196	4,08	,45	1-308	1,680	,196
	Male	114	4,01	,52			
P_ Attitudes AI	Female	196	3,92	,69	1-308	1,006	,317
	Male	114	4,00	,64			
N_ Attitudes AI	Female	196	2,88	,83	1-308	,832	,363
	Male	114	2,79	,86			

Wilks Lambda (λ) .420, $p < .05$

In the results of the analysis, it is seen in Table 4, no significant difference was found according to gender. When the scales were evaluated according to their mean female teachers have higher levels of responsible AI use than males, female ($\bar{X} = 4.08$) male ($\bar{X} = 4.01$) and n_attitudes towards AI, female ($\bar{X} = 2.88$) male ($\bar{X} = 2.79$). On the contrary, in p_attitude towards AI, it is seen that the averages of males ($\bar{X} = 4.00$) are higher than females ($\bar{X} = 3.92$).

The findings indicated that teachers' attitudes toward AI and responsible AI use did not differ significantly according to gender. Therefore, gender does not appear to be a determining factor in teachers' attitudes or responsible AI use in the present study. These results suggest that teachers may develop similar perceptions and behaviors regarding AI regardless of gender.

Educational level differences

In the analysis of SAC teachers' attitudes towards AI and responsible AI use levels differ according to their level of education, MANOVA analysis was applied. When the sub-factors were included, it was determined that the Levene test result ($p > .05$) met the assumption and the Box M test ($\text{Box } M = .233$, $p > .05$) met the necessary conditions. The two scales were interpreted in two separate tables.

Table 5. Analysis results according to level of education for attitudes towards AI

Variables	Level of Education	N	$\bar{X}$	S	df	t	p
P_ Attitudes AI	Graduate	119	3,91	,61	3-306	1,414	,352
	Postgraduate	191	3,98	,71			
N_ Attitudes AI	Graduate	119	2,80	,77	3-306	,365	,393
	Postgraduate	191	2,88	,88			

Wilks Lambda (λ) .578, $p < .05$

When teachers' P – N_attitudes towards AI are analysed with regards to their level of education, no statistically significant difference is observed between the groups. It can be concluded from the Table 5 not any difference according to the level of education between groups. When the averages of the groups are analysed the mean of postgraduates is higher than graduates in P and N_attitudes.

Table 6. Analysis results according to level of education for responsible AI use

Variables	Level of Education	N	$\bar{X}$	S	df	t	p
F1_Cyber Security	Graduate	119	3,98	,68	3-306	1,264	,577
	Postgraduate	191	4,02	,71			
F2_Legal Liability	Graduate	119	4,24	,55	3-306	,012	,454
	Postgraduate	191	4,19	,57			
F3_Transparency	Graduate	119	3,99	,68	3-306	1,085	,413
	Postgraduate	191	3,92	,70			

Wilks Lambda (λ) .578, $p < .05$

It was also found that there was no statistically significant difference in terms of the sub-factors of teachers' responsible AI use according to their educational background. While the average of postgraduates is higher than that of graduates in cyber security, the mean of graduates is higher than postgraduates in legal liability and transparency. As a result of these findings, teachers' attitudes towards AI and their responsible AI do not show any difference according to the level of education.

Daily internet use

Analysis was applied to determine whether there is a differentiation between SAC teachers' P and N_attitudes towards AI and responsible AI use according to teachers' daily internet use. After many combinations of variables have been tried, it was noticed that there is a difference in the frequency of internet use. Therefore, daily internet use has been analysed with MANOVA test. When we included the sub-factors of responsible AI use in the analysis, Box's M test did not meet the assumption, so the sub-factors were removed and the analysis was carried out, then Box's M test ($p > 0.05$), Wilks' Lambda ($p < 0.05$) and Levene's Test for Homogeneity values ($p > 0.05$) met the required assumptions and were within normal limits.

Table 7. Tests of Between-Subjects Effects-Daily Internet Use

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	Res_AI Use	,096 ^a	2	,048	,209	,812	,001
	P_Attitudes AI	3,863 ^b	2	1,931	4,285	,015	,027
	N_Attitudes AI	4,054 ^c	2	2,027	2,885	,057	,018
Intercept	Res_AI Use	4599,812	1	4599,812	19936,973	,000	,985
	P_Attitudes AI	4346,440	1	4346,440	9644,494	,000	,969
	N_Attitudes AI	2340,801	1	2340,801	3331,995	,000	,916
Daily Internet Use	Res_AI Use	,096	2	,048	,209	,812	,001
	P_Attitudes AI	3,863	2	1,931	4,285	,015	,027
	N_Attitudes AI	4,054	2	2,027	2,885	,057	,018
Error	Res_AI Use	70,830	307	,231			
	P_Attitudes AI	138,354	307	,451			
	N_Attitudes AI	215,674	307	,703			
Total	Res_AI Use	5176,049	310				
	P_Attitudes AI	4993,486	310				
	N_Attitudes AI	2745,547	310				
Corrected Total	Res_AI Use	70,927	309				
	P_Attitudes AI	142,217	309				
	N_Attitudes AI	219,728	309				

a. R Squared = ,001 (Adjusted R Squared = -,005)

b. R Squared = ,027 (Adjusted R Squared = ,021)

c. R Squared = ,018 (Adjusted R Squared = ,012)

When Table 7 and 8 is interpreted with the variable of teachers' daily internet use, it is found that there is a statistically significant difference in group which has p_attitudes towards AI ($p < 0.05$). However, there was no statistically significant difference in n_attitude towards AI and responsible AI use.

Table 8. Analysis results according to daily internet use

Variables	Internet use	N	$\bar{X}$	S	df	t	p
Responsible AI Use	0-2	67	4,04	,45	2-307	,209	,812
	2-4	147	4,07	,44			
	Above 4	96	4,04	,54			
	Total	310	4,05	,47			
P_Attitudes AI	0-2	67	3,78	,63	2-307	4,285	,015
	2-4	147	3,94	,66			
	Above 4	96	4,09	,70			
	Total	310	3,95	,67			
N_Attitudes AI	0-2	67	3,05	,96	2-307	2,885	,057
	2-4	147	2,76	,79			
	Above 4	96	2,85	,81			
	Total	310	2,85	,84			

Wilks Lambda (λ) = .02, $p < .05$

According to the results of Levene's test for equality of variances indicated that the assumption of homogeneity of variance was met; responsible AI Use ($p = .110$), p_Attitudes AI ($p = .488$), N_Attitudes AI ($p = .206$). Therefore, a Post-Hoc, Scheffe analysis was conducted to determine which groups had significant differences. According to the results of the Post-Hoc test, there was a significant difference between the teachers who use the internet for 0-2 hours a day and the teachers who use the internet for more than 4 hours a day. The results show that the p_attitude towards AI of those who use the internet for more than 4 hours a day is higher than those who use the internet for 0-2 hours a day.

Correlational findings

Multiple correlation analysis was conducted to identify SAC teachers' p_attitudes towards AI, n_attitudes and responsible AI use and three sub-factors. Correlation analysis is a statistical method used to determine the links between variables (Schwesig et al., 2023). Pearson Correlation analysis was used. The findings are shown in Table 9.

Table 9. Relationship Between Attitudes Towards AI and Responsible AI Use

Variable	1	2	3	4	5	6
1.P_Attitudes AI	1	-,221**	-,046	-,199**	,119*	,010
2.N_Attitudes AI		1	,169**	,383**	-,092	,037
3.Responsible AI Use			1	,722**	,747**	,722**
4.F1_Cyber Security				1	,355**	,188**
5.F2_Legal Liability					1	,366**
6.F3_Transparency						1

Note: N=310; * $p < .05$ ** $p < .01$

The correlation analysis is interpreted as 'low' correlation between .00-.30, 'medium' correlation between .31-.70 and 'high' correlation between .71-1.00 (Büyüköztürk, 2011). As it seemed in the Table 10 responsible AI use have high and P_correlation with its sub-factors, F1_Cyber Security ($r = .722^{**}$) and F2_Legal Liability ($r = .747^{**}$) and F3_Transparency ($r = .722^{**}$). This analysis indicates that the sub-factors have a direct and strong influence on the responsible AI use. When we examine the attitude analyses, it is concluded that F1_Cyber Security and n_attitude towards AI have P_medium correlation ($r = .383^{**}$), while p_attitude has negative and low correlation. ($r = -.199^{**}$). The result of this analysis suggests that teachers who place importance on cybersecurity may be more likely to develop n_attitudes towards AI.

Prediction of attitudes, with responsible AI use and its sub-factors

Regression analysis was conducted to determine the effect of teachers' responsible AI use and its sub-factors, cyber security, legal responsibility and transparency levels on P and N_attitudes towards AI. Two separate multiple regression analyses were conducted. In the first one, the dependent variable of p_attitude towards AI was analysed. In the second one, unfavourable attitude towards AI was selected as the dependent variable.

Table 10. Regression Coefficients of Sub-Factors of Responsible AI Use on P_Attitudes_AI

Model	B	SE	t	p	Correlation	
					Partial	Part
Constant	3,96	,323	12,287	,000		
F1_Cyber Security	-,26	,057	-4,679	,000	-,258	-,256
F2_Legal Liability	,26	,074	-3,612	,000	-,202	-,198
F3_Transparency	-,20	,057	-,347	,729	-,020	-,019

Note: N = 310

P_Attitude = $3,9 - ,26 \text{ Cyber Security} + ,26 \text{ Legal Liability} - ,20 \text{ Transparency}$; $R^2_{adj} = 0.07$

According to the results presented in Table 10, it was found that teachers' cyber security, legal responsibility and levels predicted the total variance of p_attitude towards AI at the rate of 07%. The Cyber Security factor has a negative effect ($B = -0.26$, $p = 0.000$), the Legal Liability factor has a positive effect ($B = 0.26$, $p = 0.000$), while the Transparency factor does not have a significant effect ($p = .729$). In other words, it can be interpreted that when cyber security increases, p_attitudes tends to change in a negative way; when legal liabilities increase, p_attitudes tends to change in a positive way.

Table 11. Regression Coefficients of Sub-Factors of Responsible AI Use on N_Attitudes_AI

	B	SE	t	p	Correlation	
					Partial	Part
Constant	2,091	,373	5,608	,000		
F1_Cyber Security	,564	,065	8,649	,000	,443	,440
F2_Legal Liability	-,413	,086	-4,829	,000	-,266	-,246
F3_Transparency	,061	,066	,921	,358	,053	,047

Note: N = 310

N_Attitudes_AI = 2,09+ ,564 Cyber Security - ,413 Legal Liability; $R^2_{adj} = 0.20$

As it seen in Table 11 after regression analysis it has found that teachers' responsible AI use and its sub-factors cyber security and legal responsibility levels predicted the total variance of n_attitude towards AI at the rate of 20 %. Cyber Security has a positive and significant effect on n_attitude ($B = 0.564$, $p = 0.000$), Legal Liability has a negative and significant effect on n_attitude ($B = -0.413$, $p = 0.000$), Transparency is not statistically significant ($p = 0.358$). These findings indicate that when cybersecurity awareness increases, negative attitudes toward AI also increase, whereas higher legal liability awareness is associated with a decrease in negative attitudes. Transparency did not significantly predict negative attitudes toward AI.

Discussion and conclusion

Considering the general means of the research, p_attitude towards AI was higher than n_attitude with a mean of 3.95 out of 5. This is close to Mohammed's (2023) findings, which indicated that educators had a favourable attitude toward incorporating AI into the classroom. Similarly Konecki et al. (2024)'s found that teachers primarily learn about AI on their own and have mostly p_attitudes about it. The means of responsible AI use have quite high averages with its sub-factors. It can be interpreted that SAC teachers' awareness about responsible use of AI is quite high and at the same time they have a p_attitude towards AI.

In terms of SAC teachers' general attitudes towards AI and perceptions of responsible AI use, there was no significant difference in terms of gender of the study group. Previous studies have reported mixed findings regarding gender differences in attitudes toward AI and technology use. Some research indicates that male teachers tend to report more p_attitudes toward technology and AI-related tools, whereas other studies suggest that female teachers may show higher levels of concern and anxiety related to technology use (Yetişensoy, 2024; Schepman & Rodway, 2023; Cabero-Almenara et al., 2024). These differences are often explained by variations in technology experience, confidence, and perceived risk. In the present study, no statistically significant gender difference was found in attitudes toward AI or responsible AI use. Therefore, gender does not appear to be a determining factor in teachers' perceptions of AI in this sample.

Consistent with previous researches, no significant difference was found in attitudes toward AI and responsible AI use according to teachers' education level (Güneyli et al., 2024; Uyak et al., 2023). Although some studies suggest that higher education levels may increase awareness of technological developments (Ferikoğlu, 2021), the present findings may be explained by the relatively similar professional development opportunities and selection criteria of SAC teachers. SAC teachers start to work in these educational institutions by providing certain criteria and that their professional development is close to each other even though the level of education is different.

In this study, while there was a statistically significant difference between teachers' p_attitudes towards AI according to the variable of daily internet use, there was no significant difference in n_attitudes and responsible AI use. In P_attitude, it was revealed that those who use 4 hours or more have more p_attitudes than those who use between 0–2 hours. Sarıkaya (2024) found that the digital literacy levels of Turkish teachers differed statistically significantly in favour of those who used the internet for 6 hours or more when daily internet use time was taken into account. Some studies have concluded that daily internet use does not create any differentiation in AI literacy (Banaz & Demirel, 2024). These findings contradict the studies indicating that there is a positive correlation between p_attitude towards AI and digital literacy level as daily internet use increases. Therefore, although daily internet use did not have effect on AI literacy, n_attitude and responsible use, teachers developed more p_attitude towards AI because they spent more time on the internet.

In this study, no significant difference was found in SAC teachers' AI attitudes and responsible AI use according to teachers' teaching experiences and age so, data related to these variables are not included in the findings. Previous studies report inconsistent findings, with some suggesting that less experienced teachers show more p_attitudes toward technology use, while others report no significant differences (Inan & Lowther, 2010; Seyrek et al., 2024; Uyak et al., 2023). These variations may depend on teachers' exposure to technology rather than demographic characteristics alone.

The correlation analysis result of this study showed that responsible AI use have high and positive correlation with its sub-factors Cyber Security, Legal Liability and Transparency. Furthermore, teachers who value cybersecurity are more likely to develop n_attitudes towards AI.

The relationship between cybersecurity and n_attitudes toward AI can be explained by teachers' risk awareness. Teachers who are more sensitive to data privacy and security issues may become more cautious about using AI technologies. Although they may recognize the benefits of AI in education, concerns about the protection of personal data and possible misuse may create hesitation. Therefore, cybersecurity awareness may both support responsible use and increase n_attitudes at the same time.

Similar findings have been reported in previous research examining attitudes toward AI and related constructs. In addition, AI awareness has been associated with related competencies such as digital competence (Gaber et al., 2023). Studies also indicate that teachers' attitudes toward AI are associated with variables such as AI literacy and AI anxiety (Çayak, 2024; Mart & Kaya, 2024; Eyüp & Kayhan, 2023). Consistent with these studies, p_attitudes toward AI have been linked to higher levels of AI literacy and competence, whereas n_attitudes have been associated with concerns and anxiety about AI technologies. These findings suggest that attitudes toward AI are shaped not only by perceived benefits but also by perceived risks. In this context, teachers who are more aware of cybersecurity and data protection issues may simultaneously recognize the advantages of AI while also developing concerns about its potential risks, which helps explain the findings of the present study.

While teachers' cyber security, legal responsibility and transparency levels predicted their p_attitudes towards AI at a low rate, they predicted their n_attitudes at a high rate. When similar studies were examined, it was seen that there are different studies on prediction in AI. Bakhadirov et al. (2024) found that teacher innovativeness significantly predicted the adoption of AI, but openness to new experiences did not. None of background factors like age, gender, year of study of pre-service teachers significantly predicted their attitudes towards AI (Nyaaba et al., 2024), but in opposition to this study teachers' perception significantly predicted the intention to use AI technology continuously (Zulkarnain & Yunus, 2023) and teachers' p_attitudes significantly predicted AI literacy (Çayak, 2024). All these findings lead us to conclude that teachers' AI attitudes can be predicted by many different dependent variables, but independent variables do not have the same effect. In this study, findings on the prediction of responsible AI use and its sub-factors on attitudes were obtained. It is thought that AI technologies should provide privacy, data security and ethical use of children's information while progressing with principles appropriate to children's developmental stages (Spiros et al., 2022). For this reason, we conclude that teachers' level of responsible use of AI predicts their n_attitudes and these teachers are more cautious towards AI.

Limitations and recommendations

The limitation of this study is that the data were collected through self-report scales, and therefore participants' responses may reflect their perceptions rather than their actual practices. The other limitation is that the study relied solely on quantitative data. The absence of qualitative data limited the possibility of obtaining more discussion in-depth insights into teachers' experiences and practices related to responsible AI use. Another limitation is related to the statistical analyses. Some sub-dimensions could not be included in the MANOVA analyses due to violations of statistical assumptions. Therefore, the MANOVA results reported in this study reflect only the sub-dimensions that met the required assumptions and should not be generalized to the excluded sub-dimensions.

As suggestions, some points stand out, in-service and online trainings that include the introduction to AI, use and integration of AI applications into the lesson can be increased on the basis of branches. Differentiated training programmes at local and national level for the conscious and responsible AI use applications can be made available to teachers and interactive learning environments that increase teachers' practical skills can be organized. The n_attitudes of teachers can be reduced by raising awareness especially among female teachers to recognise, use and develop p_attitudes towards AI applications.

Responsible AI use by teachers, who are individuals affecting the society, is a very important issue. It is important for teachers to recognise AI and to be able to guide their students about correct and responsible use. Since AI is a necessity of our age, it is also very important for teachers to develop p_attitudes and to understand the importance of using AI effectively and integrated into the lesson when necessary. For the

use of teachers, course contents such as public service announcements and short films on responsible use of AI can be prepared and disseminated. Moreover, teachers or students can be encouraged to prepare these contents. In the literature, such studies conducted with teachers are quite few. For the researchers; the relationship between responsible AI use and different variables such as AI anxiety, AI acceptance, AI awareness...etc can be studied and those studies can be diversified with different study groups. Studies to be conducted on these kind of subjects will increase the awareness of teachers and contribute to technology supported education.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Data Availability

The data that support the findings of this study are not openly available due to [reasons of sensitivity e.g., human data] and are available from the corresponding author upon reasonable request.

Statements and Declarations

Conflicts of Interest: The authors declare that they have no competing interests.

Ethics Approval: The authors declare that the work is written with due consideration of ethical standards. The study was conducted in accordance with the ethical principles approved by the Human Experiments

Informed Consent: All the participants have given their written informed consent.

Consent for Publication: All the participants have given their consent for the publication of the research results.

References

- Akgun, S., & Greenhow, C. (2022). Artificial intelligence in education: Addressing ethical challenges in K–12 settings. *AI and Ethics*, 2(3), 431–440. <https://doi.org/10.1007/s43681-021-00096-7>
- Alshorman, S. (2024). The readiness to use AI in teaching science: Science teachers' perspective. *Journal of Baltic Science Education*, 23(3). <https://doi.org/10.33225/jbse/24.23.432>
- Ari, S. (2024). An investigation of primary school teachers' artificial intelligence anxiety in terms of different variables. *Nevşehir Hacı Bektaş Veli University Journal of ISS*, 14(4), 2393–2405. <https://doi.org/10.30783/nevsosbilen.1519636>
- Aslan, M., Arısoy, E., & Gören, T. (2023). The relationship between learning-centered leadership and professional learning: A study on SAC teachers. *Journal of Theoretical Educational Science*, 16(1), 142–162. <https://doi.org/10.30831/akukeg.1179861>
- Baker, T., Smith, L., & Anissa, N. (2019). Educ-AI-tion rebooted? Exploring the future of artificial intelligence in schools and colleges. Nesta. https://media.nesta.org.uk/documents/Future_of_AI_and_education_v5_WEB.pdf
- Bakhadirov, M., Alasgarova, R., & Rzayev, J. (2024). Factors influencing teachers' use of artificial intelligence for instructional purposes. *IAFOR Journal of Education*, 12(2), 9–32. <https://doi.org/10.22492/ije.12.2.01>
- Banaz, E., & Demirel, O. (2024). Investigation of artificial intelligence literacy of prospective Turkish teachers according to different variables. *The Journal of Buca Faculty of Education*, 60, 1516–1529. <https://doi.org/10.53444/deubefd.1461048>
- Baykoç Dönmez, N. (2004). Bilim Sanat Merkezleri'nin Kuruluşu ve İşleyişinde Yapılması Gereken Düzenlemeler [The Regulations to Be Made in the Establishment and Operation of Science and Art Centers]. In M. R. Şirin, A. Kulaksızoğlu, & A. E. Bilgili (Eds.), *Üstün Yetenekli Çocuklar Bildiriler Kitabı [Proceedings Book of Gifted Children]* (pp. 69–84). İstanbul: Çocuk Vakfı Yayınları.
- Bezjak, S. (2024). Perceptions and perspectives: Understanding teachers' attitudes towards AI in education. In N. Trunk Širca, A. Rakowska, R. Maćik, K. Phusavat, L. Melillo, & V. Dermol (Eds.), *Artificial intelligence for human-technologies-economy sustainable development* (pp. 399–406). ToKnowPress.
- Bulut, M., Bulut, M. A., Ecer, H., Ekinci, M., Gökçe, M. S., Duymuş, Y., ... & Çoban, K. (2023). Effective teacher behaviors in the light of educational and cultural concepts. *International Journal of Social and Humanities Sciences Research (JSHSR)*, 10(96), 1372–1385. <https://doi.org/10.5281/zenodo.8112146>

- Büyüköztürk, Ş. (2011). *Sosyal bilimler için veri analizi el kitabı* [Handbook of data analysis for social sciences]. Pegem Akademi Yayınları.
- Cabero-Almenara, J., Palacios-Rodríguez, A., Loaiza-Aguirre, M. I., & Rivas-Manzano, M. d. R. d. (2024). Acceptance of educational artificial intelligence by teachers and its relationship with some variables and pedagogical beliefs. *Education Sciences*, 14(7), 740. <https://doi.org/10.3390/educsci14070740>
- Cai, Z., Fan, X., & Du, J. (2017). Gender and attitudes toward technology use: A meta-analysis. *Computers & Education*, 105, 1–13. <https://doi.org/10.1016/j.compedu.2016.11.003>
- Chen, J., Dai, D. Y., & Zhou, Y. (2013). Enable, enhance, and transform: How technology use can improve gifted education. *Roeper Review*, 35(3), 166–176. <https://doi.org/10.1080/02783193.2013.794892>
- Çayak, S. (2024). Investigating the relationship between teachers' attitudes toward artificial intelligence and their artificial intelligence literacy. *Journal of Educational Technology & Online Learning*, 7(4), 367–383. <https://doi.org/10.31681/jetol.1490307>
- Çelik, I., Dindar, M., Muukkonen, H., & Järvelä, S. (2022). The promises and challenges of artificial intelligence for teachers: A systematic review of research. *TechTrends*, 66, 616–630. <https://doi.org/10.1007/s11528-022-00715-y>
- Çetin, A. (2023). Opinions about the characteristics of gifted children. *Manas Social Studies Journal*, 12(1), 77–88. <https://doi.org/10.33206/mjss.1103185>
- Dağlıoğlu, H. E. (2010). Proficiency and characteristics of teachers in the education of gifted children, *Milli Eğitim*, 40(186), 72–84. <https://dergipark.org.tr/tr/pub/milliegitim/issue/36198/407059>
- Ding, L., Kim, S., & Allday, R. A. (2024). Development of an AI literacy assessment for non-technical individuals: What do teachers know? *Contemporary Educational Technology*, 16(3), ep512. <https://doi.org/10.30935/cedtech/14619>
- Edwards, C., Edwards, A., Spence, P. R., & Lin, X. (2018). I, teacher: Using artificial intelligence (AI) and social robots in communication and instruction. *Communication Education*, 67(4), 473–480. <https://doi.org/10.1080/03634523.2018.1502459>
- Eker, C., & Halıcı Gürbüz, S. (2024). Mathematics teachers' perceptions of competence regarding the use of artificial intelligence in mathematics lessons. *Social, Human and Administrative Sciences* 7(7), 513–528. <https://doi.org/10.26677/TR1010.2024.1425>
- <https://doi.org/10.26677/TR1010.2024.1425>
- Erden, M. K., & Uslupehlivan, E. (2020). The study of pre-service teachers' thoughts about technology usage in education today and the future. *Usak University Journal Of Social Sciences*, 13(1), 109–126.
- European Commission. (2018). *Women in the Digital Age*. Available online: <https://op.europa.eu/en/publication-detail/-/publication/84bd6dea-2351-11e8-ac73-01aa75ed71a1>
- Eyüp, B., & Kayhan, S. (2023). Pre-service Turkish language teachers' anxiety and attitudes toward artificial intelligence. *International Journal of Education and Literacy Studies*, 11(4), 43–56. <http://dx.doi.org/10.7575/aiac.ijels.v.11n.4p.43>
- Ferikoğlu, D. (2021). An artificial intelligence awareness level scale for teachers: A reliability and validity study (Publication No. 684964) [Master's thesis, Bahçeşehir University]. Council of Higher Education Thesis Center. <https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp>
- Fietta, V., Zecchinato, F., Di Stasi, B., Polato, M., & Monaro, M. (2022). Dissociation between users' explicit and implicit attitudes toward artificial intelligence: An experimental study. *IEEE Transactions on Human-Machine Systems*, 52(3), 481–489. <https://doi.org/10.1109/THMS.2021.3125280>
- Gaber, S. A., Shahat, H. A., Alkhateeb, I. A., Al Hasan, S. A., Alqatam, M. A., Almughyirah, S. M., & Kamel, M. K. (2023). Faculty members' awareness of artificial intelligence and its relationship to technology acceptance and digital competencies at King Faisal University. *International Journal of Learning, Teaching and Educational Research*, 22(7), 473–496. <https://doi.org/10.26803/ijlter.22.7.25>
- García-Peñalvo, F. J. (2023). La percepción de la Inteligencia Artificial en contextos educativos tras el lanzamiento de ChatGPT: disrupción o pánico [The perception of artificial intelligence in educational contexts after the launch of ChatGPT: Disruption or panic?]. *Education in the Knowledge Society (EKS)*, 24, Article e31279. <https://doi.org/10.14201/eks.31279>
- Genç, M. A. (2016). Üstün yetenekli bireylere yönelik eğitim uygulamaları1 [The educational practices for gifted individuals]. *Journal of Gifted Education and Creativity*, 3(3), 49–66..
- Güneyli, A., Burgul, N. S., Dericioğlu, S., Cenkova, N., Becan, S., Şimşek, Ş. E., & Güneralp, H. (2024). Exploring Teacher Awareness of Artificial Intelligence in Education: A Case Study from Northern Cyprus. *European*

- Journal of Investigation in Health, Psychology and Education, 14(8), 2358–2376. <https://doi.org/10.3390/ejihpe14080156>
- Gökdere, M., Küçük, M., & Çepni, S. (2003). Gifted science education in Turkey: Gifted teachers' selection, perspectives and needs. *Asia-Pacific Forum on Science Learning and Teaching*, 4(2), Article 5, 1. <https://doi.org/10.16923/apfslte.2003.4.2.5>
- Hasanein, A. M., & Sobaih, A. E. E. (2023). Drivers and Consequences of ChatGPT Use in Higher Education: Key Stakeholder Perspectives. *European Journal of Investigation in Health, Psychology and Education*, 13(11), 2599–2614. <https://doi.org/10.3390/ejihpe13110181>
- Hartwig, B. (2023). Top 11 benefits of artificial intelligence in 2023. Hackr.io. <https://hackr.io/blog/benefits-of-artificialintelligence>
- Holmes, W., Bialik, M., & Fadel, C. (2019). Artificial intelligence in education: Promises and implications for teaching and learning. Boston, MA: Center for Curriculum Redesign.
- Inan, F. A. & Lowther, D. L. (2010). Factors affecting technology integration in K-12 classrooms: a path model. *Educational Technology Research and Development*, 58(2), 137–154. <http://www.jstor.org/stable/40603153>
- İşler, B., & Kılıç, M. Y. (2021). The use and development of artificial intelligence in education. *e-Journal of New Media*, 5(1), 1–11. https://doi.org/10.17932/IAU.EJNM.25480200.2021/ejnm_v5i1001
- Karakaya, İ. (2012). *Bilimsel araştırma yöntemleri* [Scientific research methods]. A. Tanrıöğen (Ed.), Anı Yayınları.
- Karasar, N. (2011). *Bilimsel araştırma yöntemleri* [Scientific research methods]. Nobel Yayınları.
- Karataş, F., & Yüce, E. (2024). AI and the Future of Teaching: Preservice Teachers' Reflections on the Use of Artificial Intelligence in Open and Distributed Learning. *The International Review of Research in Open and Distributed Learning*, 25(3), 304–325. <https://doi.org/10.19173/irrodl.v25i3.7785>
- Kaş, B., & Köktürk, Ş. (2021). Evaluation of education, training, education program, and training program concepts within the scope of academic translation programs. *Journal of Social and Cultural Studies*, (8), 96–110. <https://doi.org/10.48131/jscs.988092>
- Kaya, F., Aydın, F., Schepman, A., Rodway, P., Yetişensoy, O., & Demir Kaya, M. (2022). The roles of personality traits, AI anxiety, and demographic factors in attitudes towards artificial intelligence. *International Journal of Human-Computer Interaction*. <https://doi.org/10.1080/10447318.2022.2151730>
- Kaynar, H. (2024). Education of gifted pupils in Türkiye. In A. C. Atmaca Aksoy & H. Koç (Eds.), *Current studies in educational disciplines 2024* (pp. 47–54). ISRES Publishing.
- Korkmaz, A., & Cilsalar-Sagnak, H. (2024). Perceptions of preschool teacher candidates' regarding artificial intelligence and the meanings they attribute. *Çukurova University Journal of Turkology Research*, 9(2), 1319–1342. <https://doi.org/10.32321/cutad.1561556>
- Konecki, M., Baksa, T., & Konecki, M. (2024). Teachers' Perception of AI and Their Attitudes Towards AI. *CSEDU* (1), 564, 568. <https://doi.org/10.5220/0012739300003693>
- Liua, Y., Salehb, S., & Huang, J. (2021). Artificial intelligence in promoting teaching and learning transformation in schools. *Artificial Intelligence*, 15(3). <http://dx.doi.org/10.53333/IJICC2013/15369>
- Mart, M., & Kaya, G. (2024). The examination of preschool teacher candidates' attitudes towards artificial intelligence and their artificial intelligence literacy relationship. *EduTech Research*, 2(1), 91–109.
- Miedijensky, S. (2018). Learning environment for the gifted—What do outstanding teachers of the gifted think? *Gifted Education International*, 34(3), 222–244. <https://doi.org/10.1177/0261429417754204>
- Mohammed, A. S. (2023). Examining the implementation of artificial intelligence in early childhood education settings in Ghana: Educators' attitudes and perceptions towards its long-term viability. *American Journal of Education and Technology*, 2(4), 36–49. <https://doi.org/10.54536/ajet.v2i4.2201>
- Mollick, E., & Mollick, L. (2023). Using AI to implement effective teaching strategies in classrooms: Five strategies, including prompts. Wharton School of the University of Pennsylvania & Wharton Interactive. <https://doi.org/10.2139/ssrn.4391243>
- Nguyen, A., Ngo, H. N., Hong, Y., Dang, B., & Nguyen, B.-P. T. (2023). Ethical principles for artificial intelligence in education. *Education and Information Technologies*, 28(4), 4221–4241. <https://doi.org/10.1007/s10639-022-11316-w>
- Nyaaba, M., Shi, L., Nabang, M., Zhai, X., Kyeremeh, P., Arthur-Ayoberd, S., & Nyaaba-Akanzire, B. (2024). Generative AI as a learning buddy and teaching assistant: Pre-service teachers' uses and attitudes. *arXiv*. <https://doi.org/10.48550/arXiv.2407.11983>

- Nyimbili, F., & Nyimbili, L. (2024). Types of purposive sampling techniques with their examples and application in qualitative research studies. *British Journal of Multidisciplinary and Advanced Studies: English Language, Teaching, Literature, Linguistics & Communication*, 5(1), 90–99. <https://doi.org/10.37745/bjmas.2022.0419>
- OECD. (2025, January 3). National policies for artificial intelligence. OECD. <https://oecd.ai/en/wonk/national-policies-2>
- Pörn, R., Braskén, M., Wingren, M., & Andersson, S. (2024). Attitudes towards and expectations on the role of artificial intelligence in the classroom among digitally skilled Finnish K–12 mathematics teachers. *LUMAT General Issue*, 12(3), 53–77. <https://doi.org/10.31129/LUMAT.12.3.2102>
- Sak, U. (2012). *Üstün zekâlılar: Özellikleri, tanılanmaları ve eğitimleri* [Gifted individuals: Their characteristics, diagnosis, and education]. Vize Yayıncılık.
- Sarıkaya, B. (2024). Determining digital literacy levels of Turkish teachers. *Van Yüzüncü Yıl University Journal of Education*, 21(1), 212–229. <https://doi.org/10.33711/yyuefd.1415874>
- Satmaz, İ. (2023). Views of Science and Art Center (SAC) graduates on SAC. *Educational Policy Analysis and Strategic Research*, 18(3), 316. <https://doi.org/10.29329/epasr.2023.600.15>
- Seyrek, M., Yıldız, S., Emeksiz, H., Şahin, A., & Türkmen, M. T. (2024). Teachers' perceptions on the use of artificial intelligence in education. *International Journal of Social and Humanities Sciences Research (JSHSR)*, 11(106), 845–856. <https://doi.org/10.5281/zenodo.11113077>
- Schepman, A., & Rodway, P. (2020). Initial validation of the general attitudes towards Artificial Intelligence Scale. *Computers in Human Behavior Reports*, 1, 100014. <https://doi.org/10.1016/j.chbr.2020.100014>
- Schwesig, R., Brich, I., Buder, J., Huff, M., & Said, N. (2023). Using artificial intelligence (AI)? Risk and opportunity perception of AI predict people's willingness to use AI. *Journal of Risk Research*, 26(10), 1053–1084. <https://doi.org/10.1080/13669877.2023.2249927>
- Spiros, M. C., Plemons, A. M., & Biggs, J. A. (2022). Pedagogical access and ethical considerations in forensic anthropology and bioarchaeology. *Science & Justice*, 62(6), 708–720. <https://doi.org/10.1016/j.scijus.2022.03.008>
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Allyn & Bacon/Pearson Education.
- Tabachnick, B. G., & Fidell, L. (2013). *Using multivariate statistics* (6th ed.). Pearson.
- Tondeur, J., Valcke, M., & Van Braak, J. (2008). A multidimensional approach to determinants of computer use in primary education: Teacher and school characteristics. *Journal of Computer Assisted Learning*, 24(6), 494–506. <https://doi.org/10.1111/j.1365-2729.2008.00285.x>
- Ünal, A., & Kılınç, İ. (2020). A review on the relationship between artificial intelligence and business management. *Journal of Management Information Systems*, 6(1), 51–78.
- Uzun, M. (2004). *Üstün yetenekli çocuklar el kitabı* [Gifted children's handbook]. I. Türkiye üstün yetenekli çocuklar kongresi yayın dizisi. Çocuk Vakfı Yayınları.
- UNESCO. (n.d.). Recommendation on the ethics of artificial intelligence. UNESCO. <https://www.unesco.org/en/artificial-intelligence/recommendation-ethics>
- United Nations System. (2022). Principles for the ethical use of artificial intelligence in the United Nations system. Retrieved from https://unsceb.org/sites/default/files/2022-09/Principles%20for%20the%20Ethical%20Use%20of%20AI%20in%20the%20UN%20System_1.pdf
- Uyak, S., Güngör Uyak, S., Ürey, D., Keskin, Ö., Aymaz, A., & Aydın, İ. (2023). Artificial intelligence applications in preschool education institutions: Administrators and teachers' opinions. *International Social Mentality and Researcher Thinkers Journal*, 9(75), 4625–4636. <https://doi.org/10.29228/smryj.72414>
- Uygun, D. (2024). Teachers' perspectives on artificial intelligence in education. *Advances in Mobile Learning Educational Research*, 4(1), 931–939. <https://doi.org/10.25082/AMLER.2024.01.005>
- Valls, A., & Gibert, K. (2022). Women in artificial intelligence. *Applied Sciences*, 12(19), 9639. <https://doi.org/10.3390/app12199639>
- Wang, Y., Liu, C., Tu, Y., & Y.F. (2021). Factors affecting the adoption of AI-based applications in higher education: An analysis of teachers' perspectives using structural equation modeling. *Educational Technology & Society*, 24(3), 116–129.
- Yetişensoy, O. (2024). Tomorrow's teachers and artificial intelligence: Exploring attitudes and perceptions of Turkish prospective social studies teachers. *Eurasian Journal of Teacher Education*, 5(1), 1–31.

- Yildirim, B., & Akcan, A. T. (2024). AI-professional development model for chemistry teacher: Artificial intelligence in chemistry education. *Journal of Education in Science, Environment and Health (JESEH)*, 10(4), 161–182. <https://doi.org/10.55549/jeseh.741>
- Yilmaz, H., Maxutov, S., Baitekov, A., & Balta, N. (2023). Student attitudes towards ChatGPT: A Technology Acceptance Model survey. *International Educational Review*, 1(1), 57–83. <https://doi.org/10.58693/ier.114>
- Yue, M., Jong, M.S.-Y., & Ng, D.T.K. (2024). Understanding K–12 teachers' technological pedagogical content knowledge readiness and attitudes toward artificial intelligence education. *Education and Information Technologies*, 29(3), 116–129. <https://doi.org/10.1007/s10639-024-12621-2>
- Zulkarnain, N. S., & Yunus, M. M. (2023). Teachers' perceptions and continuance usage intention of artificial intelligence technology in TESL. *International Journal of Multidisciplinary Research and Analysis*, 6(5), 2101–2109. <https://doi.org/10.47191/ijmra/v6-i5-34>